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(12) (19) (CA) **Demande-Application**

(21) (A1) **2,203,756**
(86) 1996/08/29
(87) 1997/03/06

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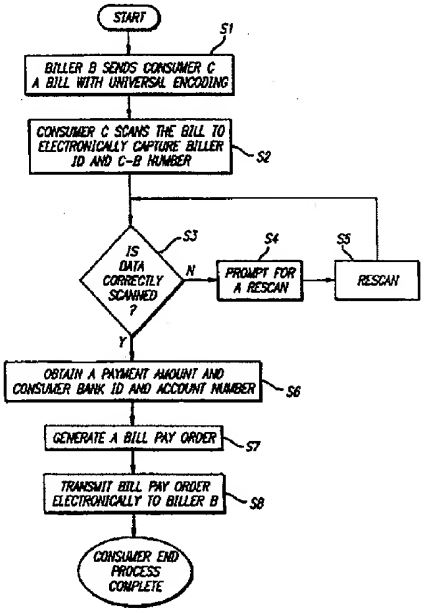
(51) Int.Cl.[6] G06F 17/60
(30) 1995/08/31 (08/521,623) US

(54) **SYSTEME DE PAIEMENT ELECTRONIQUE DE FACTURE**
(54) **ELECTRONIC BILL PAY SYSTEM**



(57) La saisie des données qui s'effectuent du côté consommateur d'une transaction de paiement électronique de facture est assistée par des informations lisibles par machine inscrites en format standard sur une facture, dans des conditions telles que ces informations lisibles par machine comprennent l'identification du bénéficiaire et le numéro de compte bancaire du bénéficiaire, ces informations étant lisibles du côté consommateur (S2) sans que des dispositions préalables ne soient prises spécifiquement entre le consommateur et le bénéficiaire. L'identification du bénéficaire s'effectue soit par un numéro de référence universel de bénéficiaire soit par des informations suffisantes pour permettre une identification manuelle et un contact avec ledit bénéficiaire (S8). Les informations lisibles par machine se présentent sous la forme d'un code barre lisible optiquement, ou de caractères d'une police conçu pour une reconnaissance de caractères sans erreur par un dispositif optique ou magnétique.

(57) Data capture which occurs at the consumer end of an electronic bill pay transaction is assisted by machine readable information in a standardized format on an invoice where the machine readable information includes biller identification and a C-B account number and the information is readable at the consumer end (S2) without prior arrangements being made specifically between the consumer and the biller. The biller identification is either a universal biller reference number or sufficient information to allow manual identification and contact with the biller (S8). The machine readable information is an optically-readable bar code, characters in a font designed for error-free character recognition by optical or magnetic means.

PCT WORLD INTELLECTUAL PROPERTY ORGANIZATION
International Bureau

INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification 6 : G06F 159/00 — A1

(11) International Publication Number: WO 97/08643

(43) International Publication Date: 6 March 1997 (06.03.97)

(21) International Application Number: PCT/US96/13990

(22) International Filing Date: 29 August 1996 (29.08.96)

(30) Priority Data:
08/521,623 31 August 1995 (31.08.95) US

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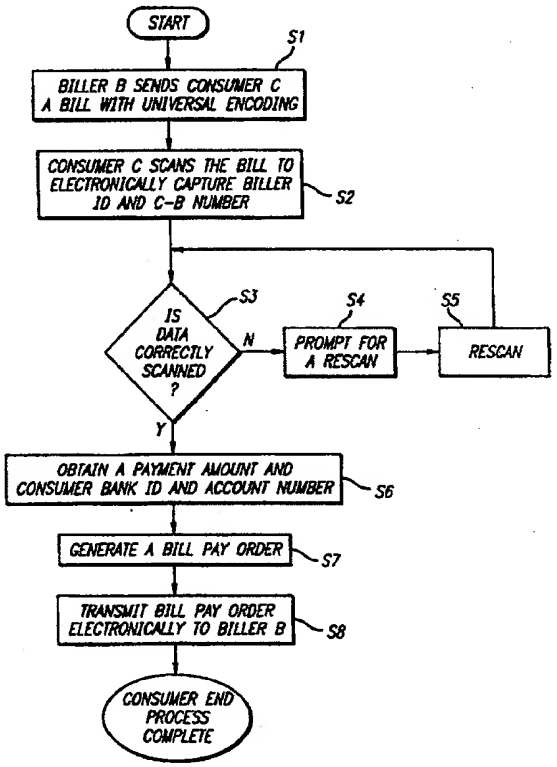
(81) Designated States: AL, AM, AT, AU, AZ, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GE, HU, IL, IS, JP, KE, KG, KP, KR, KZ, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, TJ, TM, TR, TT, UA, UG, UZ, VN, ARIPO patent (KE, LS, MW, SD, SZ, UG), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, ML, MR, NE, SN, TD, TG).

Published
With international search report.

(54) Title: ELECTRONIC BILL PAY SYSTEM

(57) Abstract

Data capture which occurs at the consumer end of an electronic bill pay transaction is assisted by machine readable information in a standardized format on an invoice where the machine readable information includes biller identification and a C-B account number and the information is readable at the consumer end (S2) without prior arrangements being made specifically between the consumer and the biller. The biller identification is either a universal biller reference number or sufficient information to allow manual identification and contact with the biller (S8). The machine readable information is an optically-readable bar code, characters in a font designed for error-free character recognition by optical or magnetic means.



ELECTRONIC BILL PAY SYSTEM

BACKGROUND OF THE INVENTION

The present invention relates to the field of electronic bill payment systems ("bill pay") which allow a consumer to direct their bank, an agent of their bank, or a non-bank bill pay service bureau to pay amounts owed to merchants, service providers and other billers who bill consumers for amounts owed.

U. S. Patent No. 5,465,206 (App. Ser. No. 08/146,515) issued to James J. Hilt et al. teaches a bill pay system in where each participating payee is assigned a biller reference number ("BRN"). That patent ("the HIlt patent") is commonly owned by the assignee of the present application and is incorporated by reference herein for all purposes. In the Hilt bill pay system, a consumer would make payment to a biller without any prior payment arrangements required between the consumer and the biller, so long as the consumer knew the biller's BRN and the consumer's account number with the biller (C-B account number). Various electronic bill payment data entry methods are disclosed in Hilt, such as entry over a telephone link using voice recognition or using the keys of the telephone, or entry into a personal computer program which eventually transmits the bill payment instructions to the consumer's bank or the bank's agent.

In other prior art systems, a biller creates an invoice which includes a remittance stub and sends the invoice with a request that the consumer return the remittance stub with the consumer's check in payment of the

invoice ("white mail"). Because billers can rely on receiving the remittance stubs back, billers will typically encode each remittance stub to assist with automatic data entry of billing information into an electronic billing system once the remittance stub and check are received. Thus, if the consumer returns the remittance stub, the biller does not have to rely on the consumer to correctly indicate the C-B account number. This system has worked well where billers actually do receive the remittance stub. However, in an electronic bill pay system, paper documents do not generally change hands.

Because paper documents do not change hands, billers must rely on the consumer for data capture of information from the invoice, which is generally less reliable than electronic (e.g., optically scanned) data capture from remittance stubs at the biller's site. In addition, where a consumer enters a C-B account number manually, the biller must still perform manual data entry.

One solution in the prior art for ensuring correct data entry by a consumer is the pick list. With a pick list, the consumer submits a list of payees with a BRN and a C-B account number for each payee. Of course, if the Hilt system is not used, more information than the BRN is required, such as the biller name, address telephone number, etc. The list of payees is then verified by the consumer's bank to ensure that the correct billers have been identified and that the C-B account numbers listed by the consumer are the account numbers for that consumer. Once this is done, the consumer is supplied with a pick list of billers. If the billers on the pick list are numbered the consumer then need only enter the pick list entry number in lieu of data capture of the biller identification and C-B account number. The pick list is

either a paper document, as might be used for telephone data entry systems, or an electronic document, as might be used for personal computer based bill payment systems.

The problem with this approach is that the ability to connect a particular consumer with a particular biller without any prior connection is lost, since the consumer must have had the biller previously verified and placed on the pick list. Thus, a consumer cannot decide to pay a new biller and make a payment without the intervening delay for verification.

The pick list approach is also undesirable because C-B account numbers can change without any awareness of the consumer. For example, in the utility industry, C-B account numbers encode for a meter reading route. The meter reading routes are periodically updated, as routes are optimized and as new housing and commercial developments arise to alter the optimization of routes and route distribution. Typically, a meter reading route for a given C-B account changes once each five years. If pick lists are used , or the consumer relies on other means of prestoring the C-B account number, the transaction will be in error once each five years. While this is not a problem for an individual error, if the error costs $25 to fix between the consumer's time, the biller's time and any customer service time and expense, the average cost per transaction in about 41 cents since the error will occur in one out of each sixty transactions (assuming monthly billing).

U.S. Patent No. 5,283,829 (issued to Anderson) discloses a bill payment system where a bill is printed with an approval code. The approval code includes error coding and maps to the C-B account number and the particular

bill (i.e., it maps to a particular month if the bills are monthly). The mapping from the approval code to the C-B account number and the month are provided by a table maintained by the biller. While this system is useful for a single biller and where current bills are paid in full, it does not include a biller identifier and therefore is not useful for a global system. Furthermore, there is no provision for automatic data capture of the data provided. A consumer must enter the number as printed on the bill, and entry errors are expected, requiring the consumer to reenter the approval code.

Therefore, what is needed is an improved method and apparatus for correctly capturing data from an invoice including data specifying biller identification and a C-B account number.

SUMMARY OF THE INVENTION

An improved bill paying system is provided by virtue of the present invention.

In one embodiment of a bill pay system according to the present invention, participating consumers pay bills electronically to participating billers using a bill payment network (hereinafter "the payment network") and the data capture which occurs at the consumer end of the electronic transaction is assisted by machine readable information in a standardized format where the machine readable information includes biller identification and a C-B account number and the information is readable at the consumer end without prior arrangements being made specifically between the consumer and the biller. In a specific embodiment, the biller identification is supplied by a BRN such as that taught in the Hilt patent.

The machine readable information can be read from a biller's invoice in a number of ways, depending on how it is present on the invoice. For example, the biller could print the information using optically-readable barcode, using a font designed for error-free optical character recognition, or using magnetically-readable characters (MICR). Alternatively, a magnetic strip could be provided on the invoice.

In another variation, the machine readable information includes a payment due date and an amount due.

The information from the invoice is read, in various embodiments, by a smart card, a specially adapted telephone, a personal computer or the like. Regardless of the exact form of hardware, the hardware includes a means for reading the machine readable information. For example, if a smart card is used, the smart card would include a reading device.

If a smart card or other portable device, such as a "smart wallet," is used to capture the billing data, the portable device might be provided to an automatic teller machine ("ATM") for communication of billing instructions to the consumer's bank. A smart card or smart wallet would also serve the additional function of being a means to verify the authorization to issue bill payment instructions much like a credit card currently serves an authorization function. If the smart card or smart wallet also had built in communication capabilities, such as a modem and a telephone connection or a wireless modem, it would send payment instructions itself.

A further understanding of the nature and advantages of the inventions her in may be realized by reference to the remaining portions of the specification and the attached drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1 is a block diagram of a prior art bill payment system with data capture at a biller terminal.

Figure 2 is a block diagram of a bill payment system with data capture at a consumer terminal according to an embodiment of the present invention.

Figure 3 is a schematic diagram of a printed bill used with the present invention.

Figure 4 shows several embodiments of a data capture means.

Figure 5 is a flow chart of a bill payment process according to the present invention.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Figure 1 shows a bill payment system 100 which is commonly used today to pay bills, where a consumer C pays pays a bill to a biller B when B sends a bill 102 to C. It should be understood that the term "consumer" is used here as an example of a bill payor, and the invention is not limited to use where the bill payor is a consumer. For example, the invention works equally well where the payor is a reseller. The actual payment of the bill occurs when a consumer bank (C bank) 104 transfers funds from an account maintained for C to a biller bank (B bank) 106, who then credits the funds to an account held for B. The other elements of system 100 are: a consumer terminal 108, which serves as the point of transit for a bill payment 110 into a postal system 112, a biller terminal 114, which is the destination of bill payment 110, a billing database 116 and a bill generator 118.

The bill payment process begins when biller B generates a bill for consumer C using billing database 116 and bill generator 118. The generated bill 102 is typically in the form of a printed invoice with a remittance stub. Bill 102 is sent to consumer C, who then encloses a check 122 drawn on the account at C bank with the remittance stub, and submits this bill payment 110 to biller B by post. Depending on biller B's instructions, the bill payment will go to either biller B or to an agent of biller B, such as a lockbox. When a bill payment is received, the necessary billing data is captured (payment amount, C-B account number, etc.) and check 112 is sent to B bank 106 for presentment, typically via a clearinghouse 120, to C bank 104.

The ability of biller terminal 114 to accurately capture billing data from the bill is generally the result of applying machine-readable encoding of the C-B account number onto the remittance stubs generated by bill generator 118. Since bill generator 118 and biller terminal 114 are both controlled by biller B, it is a simple matter to arrange for a readable encoding. Without the remittance stub, however, the bill payment becomes an exception item, which is many times more expensive to process than a bill payment with a remittance stub. With current electronic payment systems, it is assumed that the paper remittance stub is not presented to the biller.

Figure 2 shows an electronic bill pay system 200 where the remittance stub is not used. In system 200, biller B sends a bill 202 to consumer C. Consumer C uses a consumer terminal 204 to capture the data needed from bill 202 to generate a bill pay order 206. The data capture is a replacement for the prior art processes of addressing an envelope to the biller and including the remittance stub in the envelope, i.e., bill pay order 206 includes routing instructions to biller B and includes an indication of the C-B account number for the bill payment.

Bill pay order 206 is transmitted to an electronic payment network 208, which effects the transfer of funds from a consumer bank (C bank) 212 to a biller bank (B bank) 214, while providing accounts receivable (A/R) data 210 to a biller terminal 216, which reads the captured C-B account number from A/R data 210 and applies a credit to consumer C's account in billing database 218. Bills are generated by biller B using billing database 218 and bill generator 220. In order to provide backward compatibility, manual payments 222 can also be applied to billing database 218.

Figure 3 is a schematic view of a remittance stub 300. Stub 300 is shown with an indication of consumer C, biller B, an amount owed and a due date. Some of this information might be encoded in a legacy encoding region 302, which is used by biller B when stub 300 is returned with white mail payment. This legacy encoding region is generally only decodable by biller B, and in any case, no other entity has a use for it.

Stub 300 also includes a universal encoding region 304, which encodes data to be captured by consumer C which identifies biller B and the C-B account number. In the stub shown in Figure 3, universal encoding region 304 also encodes for an amount due and due date. Universal encoding region 304 might also include error correction and detection data 306. Because biller B generates bill 202, which includes stub 300, biller B is free to change the C-B account number as needed for its internal operations.

The above descriptions of Figures 2 and 3 describe the elements of a bill payment system in which data capture is performed by the consumer. Figure 4 shows details of particular data capture means and Figure 5 is a flow chart of a process for bill payment using the described system.

In Figure 4, three embodiments of a universal data capture means are shown. Figure 4 (a) shows an optical reader 400 into which the consumer slides stub 300 for data capture. Alternatively, a hand-held reader, barcode wand, flatbed scanner or facsimile engine could be used. Figure 4 (b) shows a magnetic strip reader 402 which reads a magnetically encoded strip 404 on stub 300. Alternatively, strip 404 could be replaced with MICR encoded data.

Whether optical reader 400 or magnetic strip reader 402 are used, the captured data is transmitted to consumer termial 204 for validation. Preferably, consumer terminal 204 provides an indication of validity and prompts consumer C to rescan universal encoding region 304 if a scanning error occurred.

Figure 4 (c) shows an embodiment of a universal capture means provided by a smart card. Figure 4 (c) shows a smart card 408 which includes a capability to read universal encoding region 304 off of bill 300. Smart card 408 is shown with a VISA logo 406, a liquid crystal display 410 and an array of electrical interface pins 412. To use smart card 408, Consumer C simply scans each of the bills to be paid and that information is stored internally to smart card 408. The information is downloaded from smart card 408 in a variety of ways. If the smart card is provided with other data entry means, such as an external key pad or a key pad built onto smart card 408, Consumer C can create the entire bill pay order using smart card 408. For example, Consumer C could scan a bill, enter a payment amount (if different from the amount due) and have a bill pay order generated within smart card 408. That bill pay order cant then be transmitted to the payment network via electrical pins 412. Alternatively, smart card 408 is provided with an infra-red output. Electrical pins 412 might be adapted to connect to an RJ11 telephone adaptor simply a speaker output which emits DTMF tones, or a serial link to a personal computer as to a device (wallet) with a wireless modem.

Another application for smart card 408 is for use in combination with ATMs. In this application, a consumer scans a number of bills, takes smart card 408 to an ATM and inserts smart card 408 therein. Using the key pad of

the ATM , the consumer enters any additional information, such as a source of funds, a payment amount other than the current amount due or an indication that the current amount due is equal to the payment amount, the payment date if different than the bill due date or an indication that the bill is to be paid on the due date, etc. This information is used by the ATM in combination with the data obtained by smart card 408 off the bills to generate properly validated bill pay orders. The ATM then transmits the bill pay orders to the payment network.

The flow chart of Figure 5 will now be described . The blocks of the flow chart are labeled S1 through S8, and are followed in numerical order unless otherwise indicated.

The first step (step S1) is for biller B to send consumer C a bill encoded with the universal encoding. Because it is universal encoding, any consumer can read, capture and validate it without prior contact or arrangement with biller B. In a system where each biller is uniquely identified by a biller reference number (BRN), it would suffice to encode the BRN as the biller identification field. Where the BRN is not used, sufficient biller data to uniquely identify biller B is encoded, such as the biller name, address, telephone number, etc. Preferably, the BRN is used, since less encoding is required and an automatic match-up of the biller identification field with a biller in network 208 is more likely.

When consumer C receives the bill and is ready to pay it, consumer C scans the bill electronically to capture the biller ID field and the C-B account number field (step S2). This information is transmitted from the scanning

device to a computer (typically an appropriately programmed microprocessor) for processing. This could either be a personal computer controlled by a consumer C or a processor built into the reader. For example, the consumer terminal might be an integrated telephone with a display screen, alphanumeric entry keys, an internal microprocessor and a barcode wand or reader.

The captured information is validated (S3), and if found invalid, the consumer is prompted (S4) to rescan the bill, the bill is rescanned (S5) and then rechecked (S3). The data is validated at several levels. The first level is to detect whether the expected number of bits or characters were read. At a second level, the error-correction and detection data included in the universal encoding region is used to detect and correct, if necessary, reading error. At third level, the data is compared to previously collected data from an earlier bill and the data is validated using tables of valid biller ID's and C-B account number ranges obtained from payment network 208.

Next, (S6), consumer C enters a payment amount, a payment date and an identification of the source of the funds. Of course, consumer C could rely on defaults, where the default payment amount is the scanned amount due, the payment date is the scanned due date and the source of funds is a preset bank account at a preset consumer bank. The preset information might be stored in the consumer's personal computer, screen telephone or smart card.

The information obtained in step S6 is used to generate an electronic bill pay order (S7), which is sent over payment network 208 in lieu of sending a paper check with the paper remittance stub to biller B. Once the bill pay

order is electronically transmitted (S8) to payment network 208, payment network 208 handles all the other details of transferring the funds to biller B's account, sending A/R data 210 to biller B for credit to consumer C's account with biller B, etc.

The present invention has now been described. In summary, one application of the system is to electronically capture biller identification and C-B account number identification at a consumer end of an electronic bill payment system to ensure that bill pay orders are accurate without relying on correct data entry by the consumer. This is done without prior contact between the specific consumer paying the bill and the specific send of the bill.

The above description is illustrative and not restrictive. Many variations of the invention will become apparent to those of skill in the art upon review of this disclosure. For example, the bill sent to the consumer need not be in paper form, but could be electronic, such as a via electronic mail. In this alternative embodiment, the universal encoding region would be represented by a standardized section of the bill from which the biller ID and C-B account number are capturable. The scope of the invention should therefore, be determined not with reference to the above description, but instead should be determined with reference to the appended claims along with their full scope of equivalents.

WHAT IS CLAIMED IS:

1. A bill pay system wherein a consumer directs a consumer financial institution to pay a biller's bill electronically, comprising:

a bill generator, controlled by the biller to generate a bill to the consumer, the bill including machine-readable data fields comprising at least a biller identifier field and a consumer-biller account number identifier, wherein a consumer-biller account number identified by the consumer biller account number identifier is a number used to differentiate the consumer from the plurality of consumers of goods or services provided by the biller to those plurality of consumers;

means for sending the bill to the consumer;

data capture means, controlled by the consumer, for capturing the machine-readable data fields from the bill;

validating means, coupled to the data capture means, for validating the captured data fields, wherein the validating means and the data capture means are configured to provide real-time response to the consumer if the validating means detects invalid data fields, the response being a prompt to recapture the machine-readable data fields;

a consumer terminal, coupled to electronically receive the validated data fields , which generates a bill pay order and electronically transmits the bill pay order to an electronic bill payment network , wherein the bill pay order is directed to the biller by inclusion of the biller identification field in the bill pay order; and

means, controlled by the biller, for crediting a payment amount of the bill pay order to an account indicated by the consumer-biller account number.

2. The bill pay system of claim 1, wherein the bill is a printed bill and the machine-readable data fields are printed on the printed bill and are optically readable.

3. The bill pay system of claim 2, wherein the optically readable data fields are printed bar codes.

4. The bill pay system of claim 2, wherein the optically readable data fields are dot pattern.

5. The bill pay system of claims 2, wherein the optically readable data fields are glyphs.

6. The bill pay system of claim 1, wherein the consumer is identified by a plurality of independent consumer-biller account numbers by a plurality of independent billers.

7. The bill pay system of claim 1, wherein the machine-readable fields further comprise a due date indicator and an amount due indicator.

FIG. 1
PRIOR ART

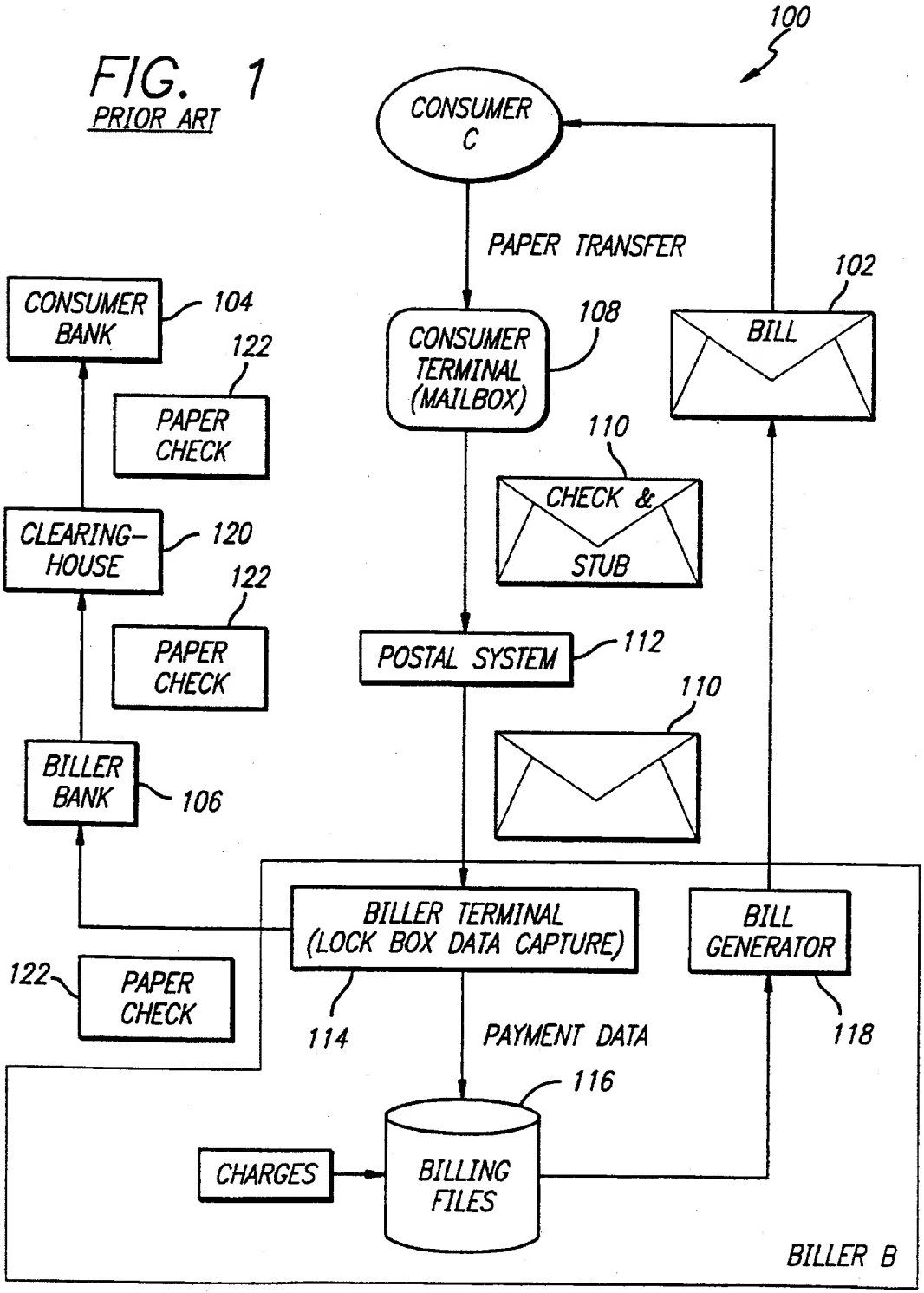


FIG. 2

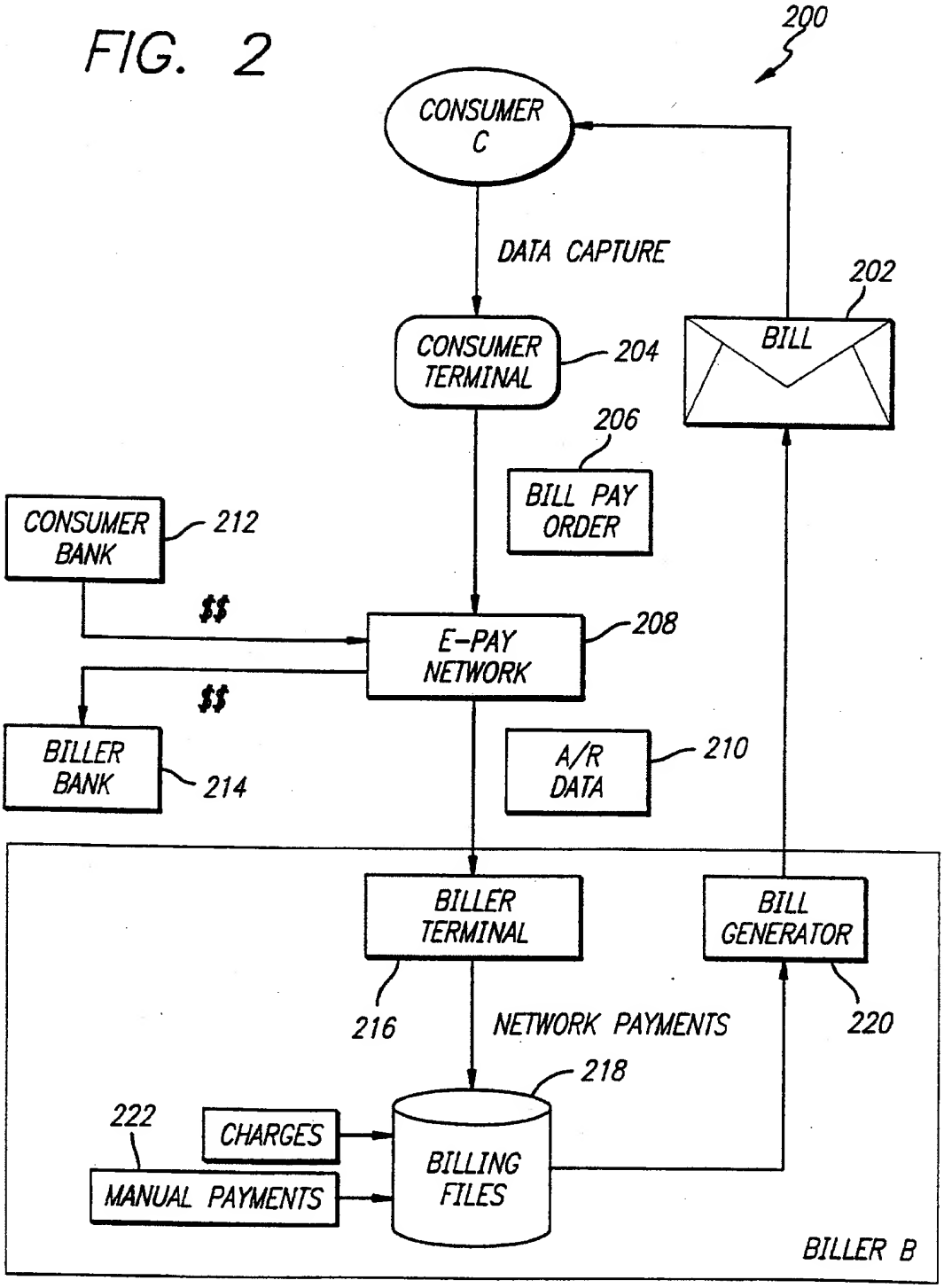

200
CONSUMER C
DATA CAPTURE
202
BILL
CONSUMER TERMINAL
204
206
BILL PAY ORDER
CONSUMER BANK
212
$$
E-PAY NETWORK
208
$$
BILLER BANK
214
A/R DATA
210
BILLER TERMINAL
BILL GENERATOR
216
NETWORK PAYMENTS
220
218
222
CHARGES
MANUAL PAYMENTS
BILLING FILES
BILLER B

FIG. 3

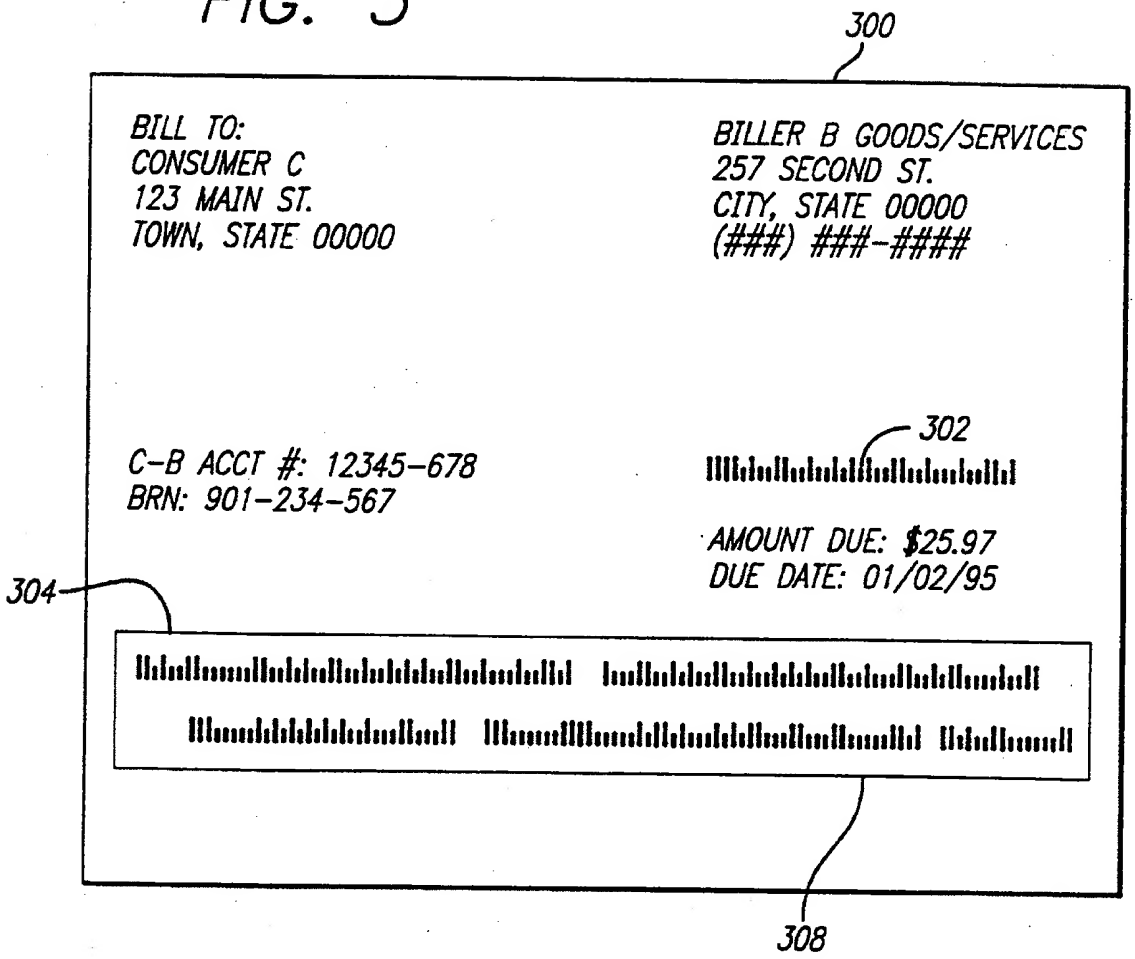
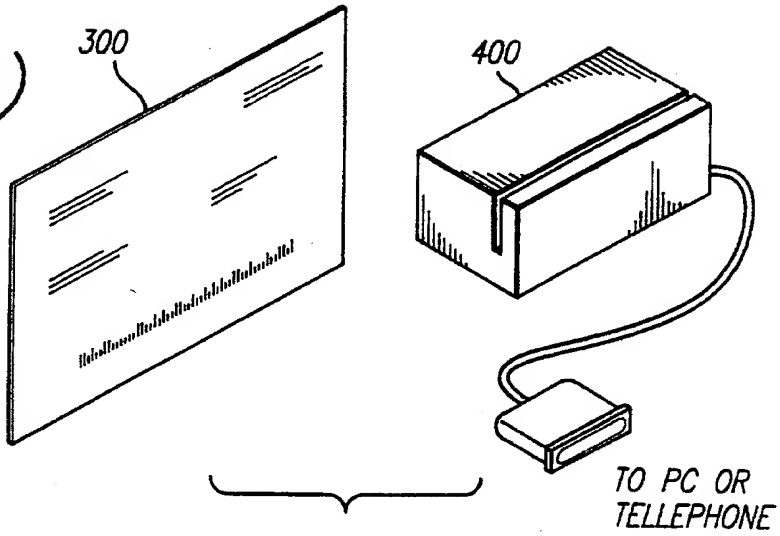

300
BILL TO:
CONSUMER C
123 MAIN ST.
TOWN, STATE 00000
BILLER B GOODS/SERVICES
257 SECOND ST.
CITY, STATE 00000
(###) ###-####
302
C-B ACCT #: 12345-678
BRN: 901-234-567
AMOUNT DUE: $25.97
DUE DATE: 01/02/95
304
308

FIG. 4(A)



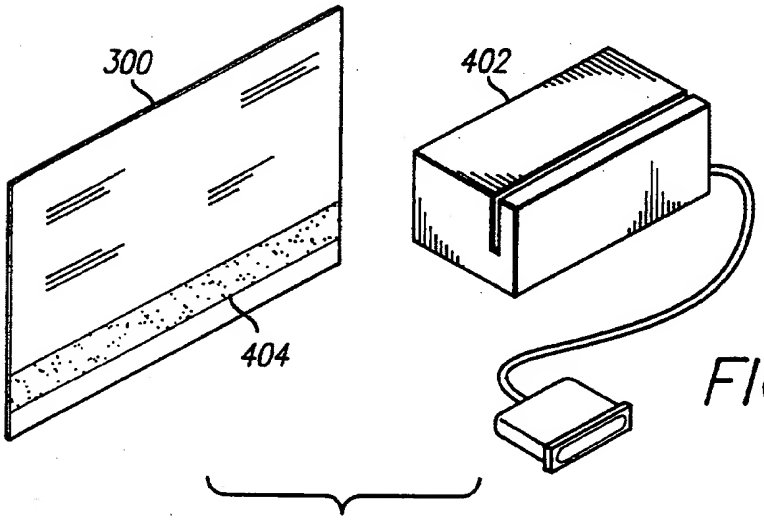


FIG. 4(B)

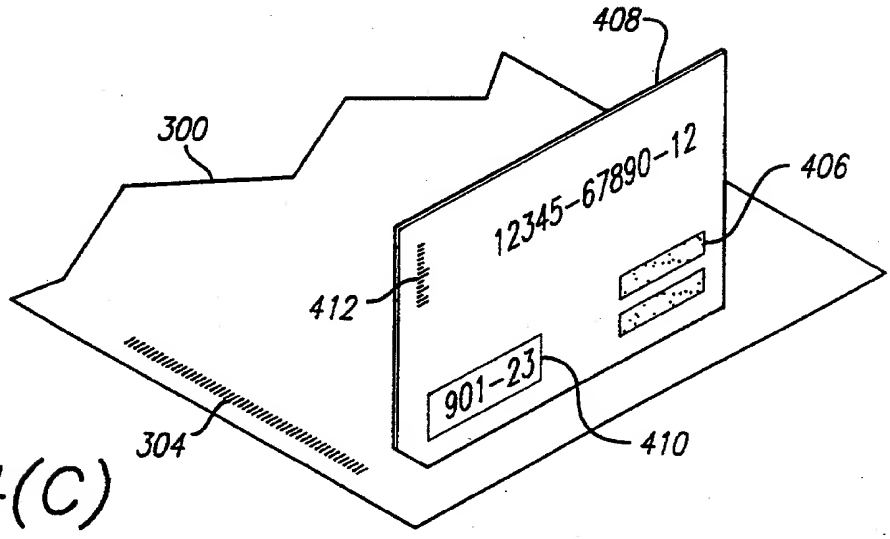


FIG. 4(C)

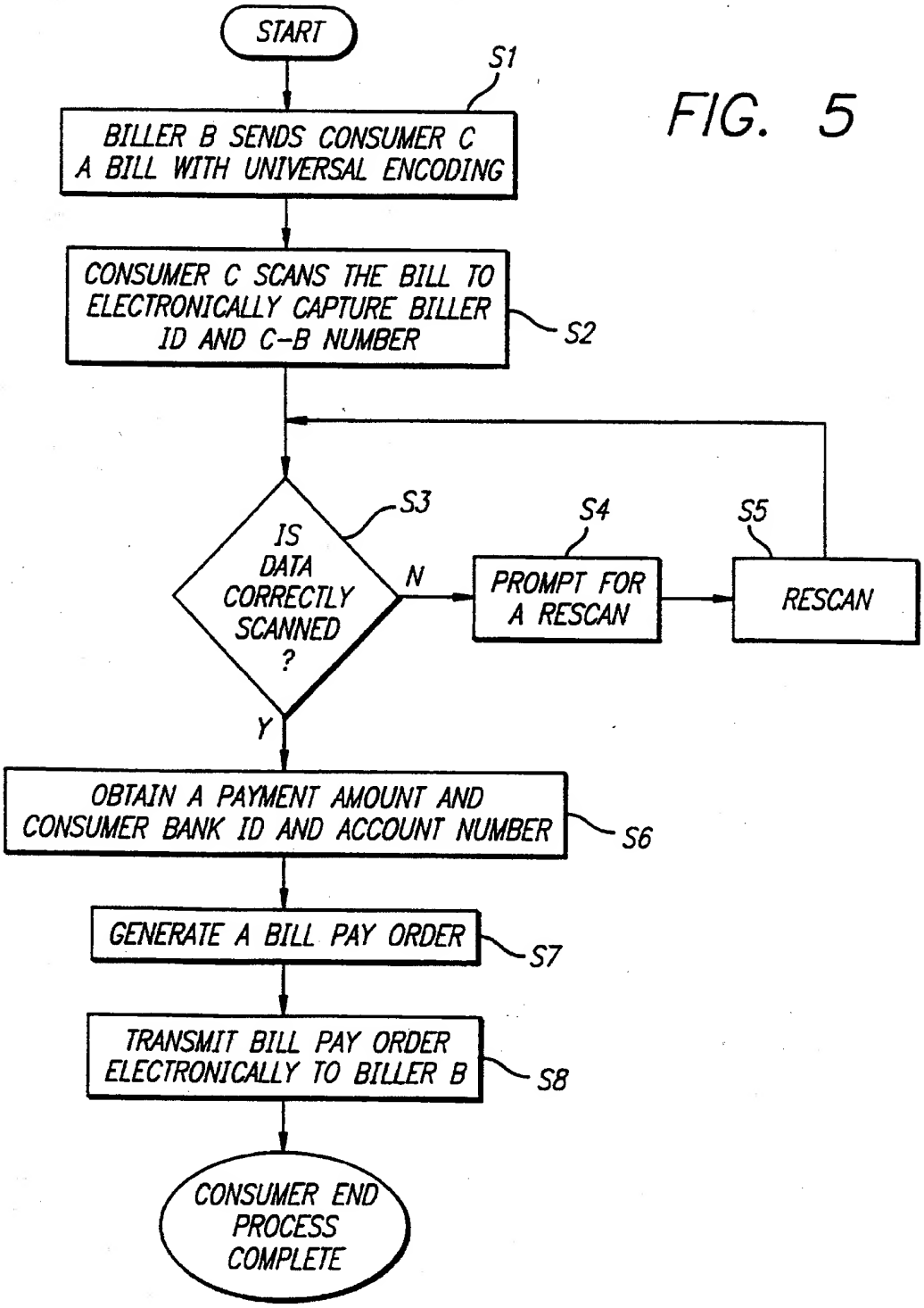

START
S1
BILLER B SENDS CONSUMER C A BILL WITH UNIVERSAL ENCODING
CONSUMER C SCANS THE BILL TO ELECTRONICALLY CAPTURE BILLER ID AND C-B NUMBER
S2
IS DATA CORRECTLY SCANNED ?
S3
N
S4
PROMPT FOR A RESCAN
S5
RESCAN
Y
OBTAIN A PAYMENT AMOUNT AND CONSUMER BANK ID AND ACCOUNT NUMBER
S6
GENERATE A BILL PAY ORDER
S7
TRANSMIT BILL PAY ORDER ELECTRONICALLY TO BILLER B
S8
CONSUMER END PROCESS COMPLETE

FIG. 5